

Rule 21 Working Group Meeting #41 - Agenda

February 11, 2003

Pacific Gas & Electric

1919 Webster Street, Oakland, CA

9:30 am – 4:00 pm

Combined Group Discussion (Approximately 9:30 am to 12:30 pm)

- Introductions, General Housekeeping, & Next Meeting Location

Next meeting: SCE facilities Fontana, Wednesday March 19

Attendees:

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- Utility Status Report Updates

PG&E has slightly changed the format of its reports. Reports over 2500 enet projects.

A request was made in the Afternoon to separate NEM projects >11 kW and also Agricultural Waste vs other in the utility reporting. There is resistance in PG&E due to additional work. However, Jerry will try it for next meeting to gauge the additional workload.

- Technical Group Updates
 - IEEE P1547 Update

P1547: 13 negatives, 7 changed to positive of original 20; re-ballot out now; 75% approval will pass the document this time to approval as official IEEE Standard. Chuck W. estimates 3-4 months before the document is stable enough for Rule 21 Working Group to change Sections I & J. Other work proceeded on P1547.2 Application Guide doc, and on P1547.3 (Communications Standard meeting).
 - Supplemental Review Document

No changes from last meeting. Some comments have been received, and put on the Tech Bin List. PG&E is asking for some additional items on the list. Disclaimer has been added to the Energy Commission website. Tony M., Edan P., and one other Tech group member may form a definition team. PG&E is asking for additional definition. Moh V. will join the definitions group.
 - Rule 21 Certification Issues
 - Fuel Cell Energy Certification Request (Model DFC300)

FCE is close to certification; should be complete today at this meeting.
 - Tecogen Anti-Islanding Certification

Testing is complete, there will be questions and discussions this afternoon; there have been many emails in the past weeks. Tecogen representative(s) are here today to discuss the issue. Tecogen was prepared to test, but held up tests after comments that the test was not appropriate. [FOCUS to make a summary of this email discussion.]

Xantrex anti-islanding discussion: how to de-certify a unit that fails a test that was thought to have passed earlier; request to add this to the bin list. Xantrex is paying to change an EPROM chip on its inverter to be able to pass anti-islanding. How Xantrex does this is not known.

Tony requests this to be reflected in the minutes: 6 months ago asked for professional documentation for actual incidents of islanding. He still has not received any such documentation. Chuck W. says P1547.2 Application Guide is also looking for this documentation, since that data is needed for his work. Tecogen rep says that it has no evidence of islanding in any field situation; they did reproduce an island in the lab, but it was a “very strange circuit” that lost its island with any slight change in the circuit. Moh V. says there is documentation for islanded conditions, points to reference in two IEEE papers: “Relay Performance in Distribution System Generator Islands”¹ and “Ferroresonance and Loading Relationships for Distribution System Generator Installations”². Ed Q. requested more clarification of the issue. The discussion will continue (though not at this meeting.)

Concern in workgroup that bin list will take too long. Bin list is prioritized to deal with issues important to DG.

¹ Wagner, C.L., W.E. Feero, W.B. Gish, R.H. Jones, “ Relay Performance in DSG Islands” *IEEE Transactions On Power Delivery*, Vol. 4, No. 1, pp. 122-132, January 1989.

² W.E. Feero, W.B. Gish, S. Greuel, “Ferroresonance and Loading Relationships for Distribution System Generator Installations” *IEEE Transactions On Power Delivery*

- Regulatory Issues:
 - CPUC Proceeding Update
 - R.99-10-025: Proposed Decision/Comments/Reply Comments
CPUC has issued a Proposed Decision on this proceeding; reply comments are being prepared. Some chance this issue will be voted on this week.
 - R.99-10-025: Follow-up to ALJ Proposal to Implement PUC Section 353.13
Proposal to extend standby exemption for cogen to 2004; Legislation in play SB46 extend to 2005
 - R.02-01-011: Proposed Decision on Departing Load Exit Fees
Comments due 2-18-2003.
 - Update on FERC ANOPR
Queueing Conference was held end of January: issues: small generators wanted to be treated in separate queue from large generators, they believed they should have preferential treatment; however, ISOs said all generators have impact on the system, and all should be treated in one queue. How to apply costs to generators, depending on impact and system benefits; batching of projects by time bin; and other issues. Plans to issue full NOPR this spring. Commissioner Wood was critical of the process from Small Gen ANOPR; discussion how to address.
 - CARB recently announced that SB1298 emissions Certification may not apply everywhere in the state.
- FOCUS Team Projects
 - DG Monitoring Study Update
LADWP has security issues with the monitoring (post-9/11) and the issue is now with their lawyers. FOCUS may find alternative sites. An issue arose with use of DSL at one site located near a transmission line; team is switching to satellite.
www.DGMonitors.com should be working by next month.

Non-Technical Breakout

- Developing Permanent Metering Requirements
 - Regulatory Process for Resolving Requirement Issue
 - Review of Net Generation Output Metering Document

What information is needed from output meters?

Customer ownership of meters—utility perspective

PG&E Net Generation Metering: RealEnergy example of generator on top of high-rise building: it is expensive, about \$600k cost for all 3 utilities. PG&E has allowed 3 circumstances where non-utility ownership of meters; however, PG&E has retrenched to requiring utility ownership. (SDG&E does not allow customer ownership of meters; SCE, since June 1, 2002, has not allowed customer ownership of meters. New Tariff introduced precipitated this change of policy: Departing Load Non-Bypassable Charges (DL-NBPC) includes Preliminary Statement “W” addressing CTC and other departing load charges.) The issue does not fit into the Advanced Metering OII, Jerry J. says. Direct access metering came out of years of discussions of liability, etc. Technologies can allow data sharing: timely, accurate, up to standards, compliance requirements. There are union issues. Agreement must be approved by CPUC. 1.

Can a customer own the meter? 2. Where can a customer put the meter? Utilities need a protocol for provision of data. Use Direct Access metering as a basis. Need special interest group to figure this out. What if RE got data from utility? RE doesn't want that option, because it has invested in current system, doesn't wish to undo that work. Utility says the same thing.

Jerry/PG&E deciding whether PG&E can support customer ownership of meter, meeting with the organizations impacted in PG&E. However, both SCE and SDG&E are satisfied with current tariff language.

- **Potential Changes to Application Forms**

Mike I. passed out an Application document with proposed changes: 1. a question whether the generating facility would be owned by third-party; 2. Four additional options at Part 3 B (4-8 added) plus notes on 8 different agreements.

Tom D. & Mike I. will develop a draft application with additional questions/request for information.

- **Development of Net Energy Metering Language (New Section to Rule 21)**

Permanent expanded NEM → need for New Rule 21 language. Need to define what that is. PG&E: if you fail net export, need alternative. Net metered projects bypass the export screen—but there's no way of assessing the impact. Hybrid projects: Multiple technologies behind single meter cause other issues. There are multiple ways of handling these requirements; need flexibility to customize the solutions for each project. Biogas net energy metering: need application and agreement documents for that. There is consensus to develop additional rules. Two parts needed: 1. Process/procedures; 2. Technical requirements. Possible Section K for process.

Bullets for Section K: PG&E Jerry J. will bring document to next meeting. Process; Technical requirements;

Technical Breakout

- Certification Issues
 - Continuing Review of Fuel Cell Energy Certification Request (Model DFC300)
 - Resolution of Tecogen Anti-Islanding Issue
- Consideration of Rule 21 Certification Requirement Modifications
- Potential Changes to Initial Review Process Screens
 - Export Screen

The following represent notes from the above meeting and relevant follow-on discussions/investigations.

Fuel Cell Energy Certification

Tim Zgonena, from UL was able to join the meeting by phone and answer a few last questions on the Fuel Cell Energy certification. The full power anti-islanding test was performed at a DR output equivalent to 89% of its rating rather than 100%. Tim explained that this was a result of

the available reactive components. In UL's opinion that the results of that test and of the lower power tests (25% and 50% of rated power) indicated that the unit would operate properly at full power. Tim further verified that UL's certification of results applied to the full power rating of the unit. This slight confusion led to the suggestion that the test levels be shown in the test procedure as allowable ranges rather than fixed values.

Applicability of UL1741 Anti-islanding Test to Induction Generators

A recent flurry of e-mails on this topic between committee members precipitated from the expressed intention of Tecogen Inc to have its induction generator Certified as non-islanding per Section J of Rule 21. This unit had previously received Rule 21 Certification though without the Non-Islanding designation. Following the e-mail discussion and conversations by various members with outside experts, the two remaining issues discussed at the meeting were the impact of and response to ferroresonance and redundancy or fail-safe characteristics of the voltage sense circuits.

Ferroresonance is the interaction of a synchronous or induction generator³ a transformer, and capacitance usually after separation of those components from utility control (an island). Unchecked, it can result in dangerously high voltages and significant harmonic distortion, and is usually associated in a marked shift in frequency. The group discussion touched on a number of issues including the possibility of very high frequencies (300 Hz) and the ability of the unit to detect those high frequencies. The discussion referenced work done by Wagner, Feero, et al⁴. Specific relay problems are mentioned in that paper. In a later discussion, Feero felt that while ferroresonance is always something to be cognizant of (for all types of generators), the UL anti-islanding test should be adequate for induction generators, and that the high frequency scenario was not likely due to both voltage stress issues, and mechanical limitations of the generator.

With respect to Tecogen, the certification sub committee will await the final report from UL, allow a week for review, and then meet via conference call to determine if the results are acceptable or if additional information is needed.

Clarifications to Option 3 under Screen 2 (Export)

After a lengthy discussion about the background and intent of the Option, three specific points of confusion were identified that need to be addressed:

- The initial screen question is "Will Power be exported across the PCC?". The implication is that the four options will verify that no power will be exported across the PCC, which Option 3 seems to contradict, specifically allowing some "incidental" export.
- The term "Service Equipment" needs to be defined
- The terms "service transformer" and "intervening transformer" need to be defined

From the discussion, and in particular, from those who were originally involved in the development of the language, the following was the consensus interpretation of the option as it currently exists in the Rule:

³ An induction motor can contribute as well, though its mechanical load, rather than mechanical power, tends to dissipate the problem quickly

⁴ See footnote 1 above.

- Option 3 was intended to allow some export. To eliminate that source of confusion, the wording of the Screen question could be revised to something like “Is the Export requirement met?” similar to Screens 5, 7, and 8.
- “Service Equipment” was intended to mean the main/primary/initial electrical equipment through which the EC provides power to the customer’s facility, i.e. at the PCC and not a secondary panel within the facility to which the DR may be connected.
- “Service Transformer” and “intervening transform” both imply an EC-provided transformer servicing the customer’s facility, and not isolation or step-down transformers within the customer’s facility.

It was also requested that the meaning of the phrase “limit the incidental export of power” be quantified. The suggestion that seemed to resonate with the group was to use the stated requirements: no more than 25% of the nominal ampere rating of the Customer’s Service Equipment or more than 50% of the service transformer rating, though this does not define a duration or frequency.

Finally, this interpretation could be further enhanced by revising the Significance to read:

(1) If it can be assured that the Generating Facility will not export power or that any export will be limited to a fraction of the capacity of the EC’s distribution equipment, Electrical Corporation’s Distribution System does not need to be studied for load-carrying capability or Generating Facility power flow effects on Electrical Corporation voltage regulators as the Generating Facility will simply be reducing Customer’s load on Electrical Corporation’s Distribution System.

Bin List

Because of extended discussions on the issues above, the committee did not review and revise the Bin list. Interested parties are requested to submit comments on the prioritization of the technical bin list items (i.e., suggest a 1-3 ranking for each unranked item, 1 being high priority, 3 being low) and suggestions for new topics.

Participants:

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California Rule 21 Workgroup Technical Issues Bin List

Priority	Issue	Where	Who
1	Disconnect switch requirements	SupRev	Lacy
1	Nominal voltage – Definition; Use of 120, nominal vs typical vs average; relay settings	SupRev	Edd
1	Modify Export Screen	Rule 21	Whitaker
1	Inadvertent Export	Rule 21	Cook
1	Disclaimer on SupRev Web page	Sup Rev	Whitaker
1	Address net-metered systems in Rule 21	Rule 21	
2	Technical aspects of metering (e.g., Net Generation Output) Need input from non-tech	Rule 21	
2	Define Requirements for relays (for non-certified equipment)	Rule 21/ SupRev	
2	Review/adopt IEEE 1547 requirements	Rule 21	
2	Review/adopt FERC small gen requirements	Rule 21	
2	Supplemental Review Guideline updates	Rule 21	
3	Networks	Rule 21	
3	Additional Definitions	SupRev	
3	Bibliography	SupRev	
	Loss of Synchronization Requirements		
	Test and Certification: Rotating Machine tests	Rule 21	
	Clarification of Inadvertent vs. Incidental Export	Rule 21	
	Clarification of use of transfer switch package in D.1.b	Rule 21	
	Clarification in I.3.b(2) that the reverse or minimum power relay does not have to be at the PCC, to allow for eligible and non-eligible generators on the same service account, as required in the proposed decision on R95-10-025, issued 1/10/03	Rule 21	
	Clarification of non-islanding, anti-islanding, active anti-islanding, positive anti-islanding	Rule 21	

Priority	Issue	Where	Who
	Clarification of the 2 second allowance in J.7.a(3) method 2 versus 1 second for Momentary parallel	Rule 21	
	Define the term “promptly” in D.3.b(2) (2 seconds?)	Rule 21	
	Clarification of Option 3 of the Export Screen	Rule 21	
	Change Rule to Not allow Export, except where required	Rule 21	
	Clarification of Anti-Islanding test for synchronous and induction machines	Rule21	
	Distinguish Rule 21 Certified equipment list from other lists		
	Clarify issue of “utility-approved” relays	Rule 21/ Sup Rev	
	Solicit other suggested changes to Rule 21		

4-Feb-03

Minutes prepared by:

